San Francisco Bay
Regional Sediment Management Program

A Proposal for the 2016 NOAA Coastal Management Fellowship Program

Submitted by:

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San Francisco Bay Regional Sediment Management Program
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I. Background / Introduction

The nine-county San Francisco Bay Area is home to approximately seven million people, making the San Francisco Bay one of the world's most urbanized estuaries. Climate change has the potential to dramatically alter the economy, environment and quality of life in the Bay Area. Climate change is not the only major change the estuary is facing. Recent and ongoing work by the US Geological Survey (USGS) and the San Francisco Estuary Institute (SFEI), and other leading physical process scientists have identified a dramatic reduction (thirty seven percent) in sediment supply to the Bay from the Sacramento/San Joaquin Delta (Delta). Additionally, a few currently proposed projects in the Delta (the California Water Fix Project and the Eco Restore Project) are estimated to reduce sediment supply by an additional nine percent. The Bay Area is in great need of sediment for wetland restoration projects around the estuary; two of the largest planned wetland restoration projects in subsided areas (South Bay Salt Ponds and Skaggs Island) alone are estimated to need 95 million cubic yards to reach current marsh plain elevation. Reduced sediment supply combined with the need for sediment for successful tidal restoration compounds the challenges the Bay Area faces with future rising sea levels.

The San Francisco Bay Conservation and Development Commission (BCDC) is a regional state agency with permit authority over work in the Bay and along the shoreline, and has prepared a comprehensive San Francisco Bay Plan (Bay Plan) with policies to guide its consideration of proposed projects. BCDC is also the federal Coastal Zone Management Agency for the San Francisco Bay segment of the California coastal zone. BCDC, the nation's first coastal management agency, was established in 1965 to stop the haphazard filling of the Bay and to expand public access to the shoreline. BCDC has been very successful in achieving these two objectives; the Bay is now considerably bigger than when the agency was created, and there is extensive public access to and use of the shoreline, and large-scale ecosystem restoration projects are underway to restore some of the Bay's historic tidal marshes. To continue its mission of promoting protection, enhancement and responsible use of the Bay, BCDC has developed a sediment management team with expertise on projects that manage or use sediment and is working across sectors to educate stakeholders and address the issue of reduced sediment supply to the Bay.

Sediment management activities have been occurring in the Bay for decades and are regulated by a number of different agencies. BCDC has long been a partner in the Long Term Management Strategy for the Beneficial Reuse of Dredged Sediment in the Bay Region (LTMS). The LTMS is an interagency group consisting of the US Environmental Protection Agency, the US Army Corps of Engineers and the State, Regional Water Quality Control Board and BCDC (LTMS agencies). Through this program the LTMS agencies have a long-standing cooperative relationship with NOAA National Marine Fisheries, the US Fish and Wildlife Service and the California Department of Fish and Wildlife (resource agencies). The seven agencies jointly manage dredging projects in San Francisco Bay, to the benefit of both the dredging community and the agencies in providing efficient permitting practices, reduced environmental impacts, and increased beneficial reuse of dredged sediments in habitat restoration projects. As

research has emerged indicating significant decline in sediment supply to the Bay and in conjunction with the need for large quantities of sediment for habitat restoration and sea level rise adaptation, BCDC along with the other LTMS agencies have identified the need to include additional sediment management sectors into a regional plan to best utilize the limited sediment resources in the Region.

BCDC has taken the lead in the effort to develop a San Francisco Bay Regional Sediment Management (RSM) Plan. The goal of the program is is to prepare an integrated, regional sediment management strategy/plan that includes research, analysis, and preparation of improved management strategies for Bay sediment that will maximize the health of the Bay and its various habitats, minimize management costs, and help address climate change impacts and other system stressors. In addition development a RSM Program is consistent with several goals in the BCDC's strategic plan including: (1) promoting optimum and sustainable use and management of Bay resources; (2) improving and implementing BCDC's program for protection, use and restoration of Bay resources; (3) improving coordination and interaction with other agencies to improve the Bay; and (4) assisting the BCDC in playing an integral role in developing and implementing a regional proactive strategy for dealing with global climate change. In addition, the RSM Program will facilitate the Commission's goal of integrating science into its management decisions.

The RSM Program is a "system-based approach" that seeks to solve sediment-related problems by designing solutions that fit within the context of a regional strategy. It is the integrated management of littoral, estuarine, and riverine sediments to achieve balanced and sustainable solutions to sediment-related needs. This approach provides opportunities to achieve greater effectiveness and efficiency. It involves making local project decisions in the context of the sediment system and forecasting the long-range implications of management actions. The Program recognizes sediment as a resource – sand and sediment processes are important components of coastal and riverine systems that are integral to economic and environmental vitality. Development of an RSM Program requires engaging many stakeholders, as sediment management activities may potentially have system-wide effects. It also recognizes that sediment management actions have potential economic and ecological implications beyond a given site, beyond originally intended effects, and over long time scales (decades or more).

The San Francisco Bay RSM Program is based on the concept that sediment is a valuable resource that should be conserved and used to benefit Bay Area habitats, recreation and shoreline stability. The LTMS Management Plan is based on the same concept, but focuses solely on the beneficial reuse of dredged sediment from navigation projects and does not consider other managed sediment sources and needs in the Bay Area. The RSM program will expand on the successful LTMS program to include flood control channels, beach nourishment, watershed management, aggregate mining and habitat restoration projects. BCDC continues to work with its LTMS partners to expand the partnership to a broader group of sediment managers and stakeholders.

To date, BCDC has amassed, reviewed and catalogued sediment process research in San Francisco Bay; surveyed and met with local shoreline managers in Central San Francisco Bay regarding shoreline erosion and accretion; identified sediment needs for habitat restoration projects; investigated existing beaches, within Central Bay; hosted a "State of the Sediment" conference and "Science of Sediment workshop"; gathered management concerns and questions surrounding sediments; and will have drafted a Pilot Regional Sediment Management Plan for Central San Francisco Bay prior to the fellowship. This work has been developed in collaboration with a number of agencies and researchers. The NOAA Fellow will take the existing Central Bay Pilot Plan and expand it to include Suisun, North and South Bay.

Expansion of the Program to the entire Region and development of a cohesive Plan will involve identifying and engaging key partners in these new geographic areas, meeting with local agencies and stakeholders to identify the sediment issues and needs, developing new products to further the ability to do spatial analysis of sediment issues and needs. The RSM effort will result in a broad suite of solutions that considers individual needs of local communities, regional entities and state agencies; provide opportunities for integrated, cross-sector and cross-jurisdictional solutions; and apply to various geographic and time scales. To be successful, the sediment management team will engage key partners in the planning process both individually and collectively. The Fellow will engage with regional partners to identify important sediment issues and develop solutions that address the local, agency or organization's vision and values. Then working collectively as a group, all of the partners will have an opportunity to evaluate these solutions, consider if additional solutions are necessary, and prioritize solutions that achieve integrated, cross-sector and cross-jurisdictional benefits.

The Regional Sediment Management Program will result in recommendations to BCDC's Commission and suggest potential policy changes, if necessary for changing sediment management practices. This project will support future regional efforts to manage sediments in a holistic way, provide lessons learned, and identify opportunities for integrated shoreline solutions that are transferable within the Bay Area and beyond.

II. Goals and Objectives

The goal of the proposed NOAA Coastal Management Fellow project is to work with the Sediment Management Program staff and partners to expand the San Francisco Bay Regional Sediment Program beyond the pilot stage and into new parts of the Bay Area. This will involve working with existing partners and initiating new partnerships in the Suisun, North and South Bay. S/he will accomplish this by working closely with the entities directly responsible for managing sediment resources, including the US Fish and Wildlife Refuge managers, the State Coastal Conservancy, the Ports, flood protection agencies and the LTMS partners among others.

The specific objectives of the Project are to:

- To create a comprehensive regional sediment management plan that is inclusive of dredging, sand mining, flood protection, habitat restoration and climate change adaptation.
- Expand the pilot regional sediment management plan beyond Central Bay into Suisun, North and South Bay.
- Meet with local and regional stakeholders to gain a better understanding of sediment issues throughout the Bay Region and engage the community in managing sediment within a regional context.
- Educate stakeholders about sediment issues, the changing Bay system and how shoreline features may change over time.
- Understand the trade offs between different management strategies and develop a balanced approach to sediment management issues.
- Craft recommendations to improve regional sediment management.
- Provide the fellow with an opportunity for meaningful, productive experience that contributes to professional growth and development, by working closely with BCDC staff, regional and local partners and stakeholders to advance resilience the Bay system.

III. Milestones and Outcomes

Task	Timing
Fellowship Begins	August 1, 2016
Orientation Period	August 2016– September 2016
Detailed Work Plan	October 2016
Meet with key stakeholders in Suisun Bay to identify sediment related issues, particularly around shoreline erosion and accretion.	November 2016 – January 2017
Report summarizing findings, development of GIS layers depicting areas of erosion, accretion, habitat restoration projects, sediment management activities, and areas of special ecological concern.	February 2017
Meet with key stakeholders in North Bay to identify sediment related issues, particularly around shoreline erosion and accretion.	March 2017 – May 2017
Report summarizing findings, development of GIS layers depicting areas of erosion, accretion, habitat restoration projects, sediment management	June 2017

activities, and areas of special ecological concern.	
Meet with key stakeholders in South Bay to identify sediment related issues, particularly around shoreline erosion and accretion.	July 2017 – September 2017
Report summarizing findings, development of GIS layers depicting areas of erosion, accretion, habitat restoration projects, sediment management activities, and areas of special ecological concern.	October 2017
Assist in drafting the expanded regional sediment management plan.	November 2017 – January 2018
Disseminating, Communicating and Receiving Comments on the draft expanded plan.	February 2018 – May 2018
Assist in revising and finalizing the regional sediment management plan.	June 1, 2018
Final report and briefings for BCDC Commission	July 2018

Specific anticipated outcomes of benefit to the State CZMA program include:

- The development of sediment management strategies that address the reduction of sediment supply to the Bay. A balanced approach to beneficially using sediments from a number of sectors to the benefit of the Bay as a whole. The process to develop these strategies will be transparent and transferable.
- Recommendations to increase the resilience the Bay, particularly its marshes and natural shorelines where sediment can be used rather than be disposed of.
- Enhanced coordination among multiple local, state and federal agencies, nonprofit organizations and user groups with interests in the management of San Francisco Bay that will aid in increasing resilience, identifying appropriate strategies, developing monitoring approaches and prioritizing actions.
- Production and dissemination of tools and communications materials that will describe the process undertaken, the findings and outcomes and will be designed to lead to implementation and further work.
- A better educated stakeholder community that can assess the priority uses of sediments.

Specific anticipated outcomes of benefit to the Fellow include:

- Become familiar with coastal management issues, laws, policies and practice in San Francisco Bay.

- Improve skills in oral and written communication, project management, meeting management and facilitation, and managing partnerships.
- Interact with the major local, state and federal agencies, nonprofit organizations, industry, and other user groups with interests in the management of San Francisco Bay.
- Develop expertise on physical process, management activities, and climate change issues as related to sediment in an estuarine setting.
- Play a significant role in advancing fundamental changes in the way San Francisco Bay is managed.

IV. Project Description

The following provides an outline of the major tasks to be undertaken as part of the project. Please note that the Fellow will be responsible for developing a work plan that will describe in more detail how the following tasks will be accomplished.

Orientation. The first stage of the Fellowship will involve orientation to BCDC's staff, laws and policies, and the major issues facing management of San Francisco Bay, particularly in light of the decline in sediment supply. The fellow will attend weekly BCDC staff meetings and twice-monthly BCDC Commission meetings, LTMS program manager and Management Committee meetings, as is feasible and necessary.

During the orientation period, the Fellow will be integrated into BCDC's Sediment Management Team. The Fellow's mentor, Brenda Goeden, will ensure that the Fellow is exposed to relevant sediment management and climate change adaptation background materials. The Fellow will review and, as appropriate, attend meetings with various sectors that work on sediment issues from beach nourishment, habitat restoration, dredging, sand mining and flood protection. Principal among these are LTMS meetings, Dredged Material Management Office, San Francisco Joint Venture, the Bay Area Flood Protection Association, and project team meetings. The Fellow will be introduced to regional partners and spend a certain percentage of their time working directly with and supporting partners. The Fellow will also work with the mentor to develop a detailed work plan to accomplish the objectives of the project.

Expanding the Pilot Program. The Fellow will become familiar the pilot plan for Central San Francisco Bay, its components, strategies and recommendations. The team will familiarize the fellow with the surveys and meeting formats used for the Central Bay RSM. Together with the team the Fellow will develop a revised survey and meeting materials for each region, and develop a key stakeholder list. Once the preparation is complete, the Fellow will plan and execute local meeting with stakeholders to introduce the RSM program, provide a brief background on sediment issues facing the Bay, and specific to that region and solicit information about specific issues within the region. Once the meeting is completed, the Fellow will document the findings and analyze the information in a report and using GIS tools. Maps

and GIS layers will likely need to be developed. This work will be completed for each region sequentially so information can build up each step.

Once meetings and findings for each region are completed, the Fellow, working with partner agencies and the BCDC team will develop recommendations for each region, and help synthesize the information into a complete Bay Regional Sediment Management Plan.

The Fellow will then send the draft document out to stakeholder and request further comment. Once comments are received, the document will be revised and finalized. As the document and program are completed the Fellow would develop a presentation to the Commission and solicit their feedback or adoption. Once the Commission has approved the final document, the Fellow will coordinate closely with partners to develop and disseminate resources developed through the project with the objective of communicating these efforts at local, regional and state levels.

V. Fellow Mentoring

The BCDC Coastal Fellow will be mentored by Brenda Goeden, Sediment Program Manager, who oversees the Sediment Management Program and is on multiple BCDC intra-agency and inter-agencies teams, involving key federal, state and local partners, as well guiding related research activities. This mentorship will provide the Coastal Fellow with opportunities to learn about and gain experience in regional planning related to sediment resources and climate change and gain an understanding of how plans and strategies would be implemented on a project specific level. BCDC has an interdisciplinary team who will also be able to work closely with the Coastal Fellow.

Brenda Goeden is the San Francisco Bay Conservation and Development Commission's (BCDC) Sediment Program Manager. She supervises the day-to-day operations of the Commission's Sediment Management Team, which implements the Long Term Management Strategy (LTMS) for the Placement of Dredged Sediment in the San Francisco Bay Region program, regulates sand mining activities and the regional sediment management program for the Bay, in collaboration with other regulatory and resource agencies in the Bay Area. She is a member of the interagency Dredged Material Management Office overseeing sediment quality testing and placement site determinations. She has worked on large-scale restoration projects, the development of the Subtidal Habitat Goals Report and the Update to the Baylands Ecological Habitat Goals Project. She has mentored Coro, Sea Grant and NOAA Fellows, and has multiple short-term interns within her program. In addition, the Fellow will have two team members who will be able to provide additional guidance and act as a sounding board for the work being undertaken.

The Coastal Fellow will be welcomed as a member of the BCDC sediment management staff and will interact with the Commission staff as a colleague and an integral part of the staff's planning team. BCDC's offices are located in a high-rise office building in the heart of San Francisco's Civic Center within close proximity to civic government offices, museums and local

cultural events. The fellow will have a cubicle office in the Commission's offices. BCDC's 42-member staff maintains a collegial, interactive team-oriented environment. The Coastal Fellow will also be expected to meet with other agency representatives to gain an understanding of the different resource and regulatory functions and issues affecting the Bay. During the beginning stages of the project, the mentor will work closely with the Coastal Fellow to orient him/her to the agency, project and partners, including attending meetings with the Coastal Fellow, but as the work progresses, more independent work and work integrated within the team will be expected. The mentor will be available to provide training, guidance, and professional contacts as needed throughout the fellowship.

VI. Project Partners

San Francisco Bay is managed by a number of agencies, including federal, state, and local organizations. BCDC is partnering with multiple agencies to address how we manage sediment in the Bay, including activities such as dredging, sand mining, flood projection and habitat restoration and the Fellow will be working with many of these issues.

- **LTMS Partner Agencies** are key partners in this program. Because these four agencies (BCDC, Water Board, EPA and the US Army Corps of Engineers) are the primary regulators of sediment management activities, any proposed program should be in alignment with these agency's goals, policies and regulations. Because the development of sediment use strategies may be new, working to modify policy may be necessary. The fellow will have significant and direct interaction with key staff from these agencies. This group will be important in the development and consideration of additional sediment management strategies.
- The **Dredging Community** includes key stakeholders and is the number one mover of sediment in the Bay. While they work within the LTMS program, additional incentives and cooperative strategies are needed to prevent clean sediment from being disposed of out to sea. This group can be instrumental in reaching project goals.
- The **Bay Area Flood Protection Association** is a cooperative of flood protection managers who often think innovatively about how to incorporate multiple benefits in their flood protection projects, but need assistance in navigating the regulatory challenges to developing projects within the important fresh water interface with riparian and tidal habitat. They are the third largest movers of sediment in the Bay Area.
- The **San Francisco Bay Joint Venture** is an organization that is focused on restoring habitat along the Pacific Flyway, in which San Francisco Bay is of critical importance. As such, they provide key inroads to the wetland restoration community, including National Audubon, the State Coastal Conservancy, and the US Fish and Wildlife Service.
- The **San Francisco Estuary Partnership** is the National Estuary Program implementation agency in San Francisco Bay and carries out the Comprehensive Conservation

Management Program in coordination with a number of stakeholders working to restore the estuary.

- The **United States Geological Survey** is highly involved with sediment research in San Francisco Bay and a number of investigators from this agency provide vital scientific information and guidance on sediment processes and how management activities affect these processes.
- The **San Francisco Estuary Institute** is non-profit research entity that has a focus on status and trends of the Bay system, adaptation to sea level rise, and science that supports restoration of habitat around the Bay.
- **Local and regional governments** within the Bay Area (9 counties and 54 cities touch the Bay) have local sediment issues. Some have been identified, but others will need further investigation. Shoreline information appears to be best understood at the local level as many of these jurisdictions have parklands or beaches that they own and manage that will be part of the work that the Fellow is undertaking.

VII. Cost Share Description

The San Francisco Bay Conservation and Development Commission will provide the required annual $15,000 cash match through BCDC's regular annual budget, provided from the state of California's general fund. In addition, BCDC will provide in-kind services including office space, computer equipment, telephone, supplies, training, and mentoring.

VIII. Strategic Focus Area

BCDC's proposed Coastal Management Fellowship position aptly addresses the Healthy Coastal Ecosystems strategic focus area. The fellow working on the expansion of BCDC's pilot Regional Sediment Management (RSM) Plan for Central Bay will seek partnership among Bay Area resource and management agencies to solicit feedback and collaboration in creating a network of RSM Plans throughout the Bay Area. The intention of the current pilot RSM is to formulate consensus-driven regional sediment management guidance and recommended policy for the sand fraction of sediment in Central San Francisco Bay to the Golden Gate. The proposed fellowship project would extend this guidance to incorporate both fine and coarse grain sediment management guidance for South Bay, North Bay, and Suisun Bay. Accomplishing this goal will involve gathering and developing geospatial data that can be shared through the Coastal Sediment Management Working Group's Web Mapper, including critical areas of erosion, accretion, sensitive habitat, sediment supply, and potential sediment receiving sites such as beach nourishment and wetland restoration projects. As new mapping of the San Francisco Bay sea floor is being conducted, it will be necessary for local and regional agencies to learn how to incorporate this new data into their decision-making, and to understand how it can be used to inform the management of sediment in their jurisdiction. Development of the greater San Francisco Bay Regional Sediment Management Plan will provide the fellow with the

opportunity to create visualization tools and maps that help synthesize and communicate information to agencies and communities who manage habitats and shorelines reliant on sediment resources. The project will build on the goals of the pilot RSM (to gather existing data; identify sand sources and areas of need; work with partners to enhance, restore and maintain coastal beaches; identify policy issues associated with proposed projects; reduce shoreline erosion and coastal storm damage; and support recreation and tourism) by incorporating wetlands and fine sediments into the regional guidance document.